

January 13, 2003

California Division of Forestry  
Klamath Forest Fire Station  
185 Terwer Valley Road  
Klamath, Del Norte County

***Notice of Proposed No Further Action*** related to petroleum discharges.  
Comment Period ends February 3, 2003.

**Site History:** The CDF Klamath Facility was constructed in the late 1960's. The 1,000-gallon underground storage tank (UST) was originally used to store gasoline until 1991. In 1991 the facility obtained a new diesel powered fire engine and the UST was converted to store diesel fuel.

On October 9, 1996 the 1,000-gallon UST was removed from the site under the direction of the Del Norte County Department of Health and Social Services. After the tank was removed two holes were discovered, approximately 1/8 inch each, located in the center of the tank bottom. There was no evidence of spillage or overfill, and the tank had not been used for several years. The tank was empty when uncovered by the contractor except for approximately one-inch of water.

There was staining and a hydrocarbon odor observed in the backfill material. The eastern end of the pit was excavated to a depth of 11 feet while the western end was excavated to the practical limits, a depth of 15.5 feet. Soil samples were collected at both the eastern and western ends of the excavation. Samples were analyzed for total petroleum hydrocarbons as kerosene (TPHK), TPH as diesel (TPHD), TPH as motor oil (TPHMO), TPH as gasoline (TPHG), benzene, toluene, ethylbenzene, total xylenes (BTEX) and organic lead. Sample results indicated that hydrocarbons were detected in the sample collected from the western end of the excavation at a concentration of 6,100 mg/kg of motor oil. Groundwater was not observed in the excavation during the site activities. The excavation was backfilled with clean imported material and the concrete tank hold-down slab.

## **Investigation Results**

**Soil Borings:** Soil samples were collected from each soil boring at depths ranging from 3 feet to 16 feet below ground surfaces (BGS) for laboratory analysis.

**Subsurface Lithology:** The top 1 to 2 feet consisted of clayey silt overlying a fractured siltstone. The top of the hardpan siltstone (Franciscan Complex) ranged in depth from 11 to 16 feet below ground surface. This lithology was present for the entire depth of each boring. First water was not observed in the borings during the installation of the well points. Refusal occurred in each well point when the Franciscan Complex was encountered.

**Soil Sample Analysis:** BTEX and MtBE were not detected in any of the samples analyzed. TPHMO was only detected in SB1-12 at 64 mg/kg. This sample was located adjacent to the west end of the former tank excavation. TPHG was only detected in SB8-7 at 3.2 mg/kg, and according to the laboratory report was uncharacteristic of the gasoline profile. Low levels of TPHD were detected in most samples analyzed. However, in all of the samples which detected TPHD, the laboratory report indicated that either the hydrocarbon reported did not match the

pattern of the diesel standard, was reported late in the diesel range and did not have a pattern characteristic of a petroleum hydrocarbon. The maximum value of TPHD was detected in SB1-12 at a concentration of 310 mg/kg. However, this chromatogram did not match the standard for diesel. In the soil borings, none of the detected diesel matched the chromatograms of the diesel sample collected from the soil stockpile. Analytical results for soil samples are presented in Table 1.

**TABLE 1 SOIL ANALYTICAL RESULTS CDF Klamath Camp May 19, 1997**

Sample Location	Sample Depth (ft)	TPH Diesel mg/kg	TPH Motor Oil mg/kg	TPH Gasoline mg/kg	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Xylenes mg/kg	MtBE mg/kg
SB1-4	4	<1.0	<50	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB1-8	8	<1.0	<50	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB1-12	12	<b>310</b>	<b>64</b>	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB1-15.5	15.5	<b>13</b>	<50	<1.0	<0.005	<0.005	<b>0.013</b>	<b>0.023</b>	<0.005
SB2-7	7	<b>1.8</b>	<50	NA	NA	NA	NA	NA	NA
SB2-12	12	<b>1.8</b>	<50	NA	NA	NA	NA	NA	NA
SB2-16	16	<1.0	<50	NA	NA	NA	NA	NA	NA
SB3-7	7	<b>5.1</b>	<50	NA	NA	NA	NA	NA	NA
SB3-11	11	<b>3.8</b>	<50	NA	NA	NA	NA	NA	NA
SB4-7	7	<b>2.2</b>	<50	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB4-11.5	11.5	<b>2.7</b>	<50	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB5-4	4	<1.0	<50	NA	NA	NA	NA	NA	NA
SB5-8	8	<1.0	<50	NA	NA	NA	NA	NA	NA
SB5-12	12	<b>4.5</b>	<50	NA	NA	NA	NA	NA	NA
SB5-13	13	<b>2.8</b>	<50	NA	NA	NA	NA	NA	NA
SB6-4	4	<1.0	<50	NA	NA	NA	NA	NA	NA
SB6-8	8	<1.0	<50	NA	NA	NA	NA	NA	NA
SB6-12	12	<1.0	<50	NA	NA	NA	NA	NA	NA
SB6-16	16	<1.0	<50	NA	NA	NA	NA	NA	NA
SB7-6	6	<b>2.6</b>	<50	NA	NA	NA	NA	NA	NA
SB7-11	11	<1.0	<50	NA	NA	NA	NA	NA	NA
SB7-15	15	<b>2.0</b>	<50	NA	NA	NA	NA	NA	NA
SB8-7	7	<b>19</b>	<50	3.2	<0.005	<0.005	<0.005	<0.005	<0.005
SB8-12	12	<b>1.2</b>	<50	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB8-15.75	15.75	<1.0	<50	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005
SB9-7	7	<1.0	<50	NA	NA	NA	NA	NA	NA
SB9-12	12	<b>1.4</b>	<50	NA	NA	NA	NA	NA	NA
SB9-14.5	14.5	<1.0	<50	NA	NA	NA	NA	NA	NA

Groundwater Sample Analysis: On May 20, 1997, each well point was measured for depth to water. Only WP2 and WP8 activated the sounder, however there was not enough water in either well point to collect a water sample. The rest of the well points were completely dry. The water in WP2 and WP8 may have been associated with overnight condensation and not site groundwater.

Topography of Bedrock: The relative elevation of each well point was surveyed and the depth to bedrock was mapped. Table 2 presents the data from the relative survey. The top of silt stone

contours indicate that the slope is towards the south. Seasonal groundwater would most likely follow the contour of the silt stone and flow south toward Terwer Creek.

**Table 2. Top of Silt Stone Relative Elevation (ft)**

<b>Soil Boring</b>	<b>Depth to Silt Stone (ft)</b>	<b>Relative Ground Surface Elevation (ft)<sup>1</sup></b>	<b>Relative Elevation of Silt Stone (ft)<sup>1</sup></b>
SB-1	15.5	99.9	84.4
SB-2	16.0	98.4	82.4
SB-3	11.0	99.7	88.7
SB-4	11.5	99.8	88.3
SB-5	13.0	99.4	86.4
SB-6	16.0	98.3	82.3
SB-7	15.8	98.1	82.3
SB-8	15.8	99.5	83.7
SB-9	14.5	89.7	75.2

<sup>1</sup> Based on assumed elevation for benchmark of 100 feet above mean sea level.

**Conclusions:** Based on the information collected to date, the following conditions are present:

1. Source was removed when the 1,000-gallon UST and approximately 25 tons of contaminated soil were excavated on October 9, 1996. Soil stockpiles were removed from the site on October 28, 1997.
2. Site is underlain with hardpan siltstone (Franciscan Complex).
3. Groundwater during the well point sampling event was not encountered and is likely found in fractures below the top of the siltstone.
4. The nearest receptor is the water supply well for the CDF Klamath Facility located adjacent to the Terwer Creek approximately 370 feet east of the site. This well was sampled on November 29, 2000. A summary of the sample results (detection limits) are presented in Table 3.

**Table 3. Summary of Analytical Results for the Domestic Supply Well**

<b>Analyte</b>	<b>Result in ug/L</b>
Total petroleum hydrocarbons as gasoline	< 50
Total petroleum hydrocarbons as diesel	< 50
Total petroleum hydrocarbons as motor oil	< 170
Benzene	< 0.50
Toluene	< 0.50
Ethyl benzene	< 0.50

Analyte	Result in ug/L
Total xylenes	< 0.50
Diisopropyl ether	< 0.50
Ethanol	< 5.0
Ethyl tertiary butyl ether	< 0.50
Methyl tertiary butyl ether	< 0.50
Methanol	< 50
Tertiary amyl methyl ether	< 0.50
Tertiary butanol	< 5.0

5. Reliable analytical data shows that no BTEX constituents are present at the site.
6. A survey of the water supply wells in the area indicates that all residences and facilities in the area are located on the hillside west of Terwer Valley Road, but their wells are located in the Terwer Creek alluvium adjacent to Terwer Creek east of Terwer Valley Road. One may conclude that minimal groundwater is present in the siltstone Franciscan Complex.